**STU22004 – Lab 2 Instruction**

As discussed in lecture, the Binomial distribution model deals with finding the probability of number of success(es) in “” identical independent trials where each trial has only two possible outcomes of Success and Failure. The probability function of a Binomial distribution is:

For example, tossing of a coin always gives a head (success with probability of , for instance) or a tail (failure with probability of ). The probability of finding exactly 4 heads in tossing a coin repeatedly for 10 times is calculated estimated using the binomial distribution:

R has four in-built functions to generate binomial distribution. They are described below.

1. **dbinom**

This function gives the probability at each point, equivalent to .

dbinom(x, n, p)

1. **pbinom**

This function gives the cumulative probability of an event, .

pbinom(x, n, p)

1. **qbinom**

This function takes the probability value and gives a number which its cumulative value matches the probability value. This is to find in the following equation when , and are known:

qbinom(P, n, p)

1. **rbinom**

This function generates required number of random samples (size) of given Binomial distribution with known and .

rbinom(size, n, p)

Now, you are required to answer the following questions:

1. Find the single probability of exactly successes in 100 trials with .
2. Find the probability of exactly 0 to successes in 10 trials with.
3. For a Binomial random variable with and , find:
4. Find the 90th percentile of a binomial distribution with and .
5. Generate a random sample of 10,000 binomial random variables drawn from the binomial distribution with and . Plot the histogram of your samples.